



Network of STEM Education Centers (NSEC) 2020 National Conference

Location: Virtual Conference (Details shared in registration confirmation)

Contents

Agenda.....	1
Wednesday, June 10, 2020.....	1
Thursday, June 11, 2020.....	5
Posters	8
Acknowledgements	10
NSEC Speaker Bios	11
Concurrent Session I Abstracts	14
Concurrent Session II Abstracts	16
Virtual Showcase I Abstracts	18
Virtual Showcase II Abstracts	24
Poster Abstracts.....	30

Information for how to join each virtual presentation will be shared with all registrants.

You can post your presentations, handouts, posters here: Coming Soon

Are you a user of social media, tweet us #NSEC2020.

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Agenda

Wednesday, June 10, 2020

8:30 AM-9:30 AM PT/ 9:30 AM-10:30 AM MT/ 10:30 AM-11:30 AM CT/ 11:30 AM - 12:30 PM ET	NSEC 2020 and Starting a Dialogue <ul style="list-style-type: none">• Shadra Smith, Associate Dean of Students, The College of Wooster• Ruthmae Sears, Associate Professor in Mathematics Education, University of South Florida• Kacy Redd, Associate Vice President, APLU and co-director NSEC NSEC 2020 Slide Deck Focusing on Why Handout
9:30 AM-9:55 AM PT/ 10:30 AM-10:55 AM MT/ 11:30 AM-11:55 AM CT/ 12:30 PM - 12:55 PM ET	Plenary Address The Accelerating Systemic Change Network (ASCN)'s Change Dashboard <ul style="list-style-type: none">• Andrea L. Beach, Professor of Higher Education Leadership and Co-Director of the Center for Research on Instructional Change in Postsecondary Education (CRICPE), Western Michigan University• Charles Henderson, Director of the Mallinson Institute for Science Education; Co-Director of the Center for Research on Instructional Change in Postsecondary Education (CRICPE); and Professor, Department of Physics and Mallinson Institute for Science Education, Western Michigan University• Kate White, ASCN Research Director and Postdoctoral Research Associate, Center for Research on Instructional Change in Postsecondary Education (CRICPE), Western Michigan University• Moderator: Gwen Shusterman, Professor of Chemistry and co-director, STEM Education and Equity Institute, Portland State University Slide Presentation Online Dashboard Module: bit.ly/ASCNChangeDashboard
9:55 AM-10:00 AM PT/ 10:55 AM-11:00 AM MT/ 11:00 AM-12:00 PM CT/ 12:00 PM - 1:00 PM ET	Transition Padlet for Un-business cards and Reflections

10:00 AM-10:30 AM PT/ 11:00 AM-11:30 AM MT/ 12:00 PM-12:30 PM CT/ 1:00 PM - 1:30 PM ET	<p>Concurrent Session I <i>Participants can choose one of three virtual presentations. Choose your session in the Concurrent and Showcase Session Selection. Abstracts are in the NSEC 2020 Program Guide.</i></p> <ol style="list-style-type: none"> 1. Models, tools, and resources for engaging departments in transforming their teaching evaluation systems - Sarah Andrews, University of Colorado Boulder* - Slides 2. Instructors' Diverse and Changing Ideas About Inclusive Teaching - Glen Davenport and Leo Chen, Yale University* - Slides 3. Laying the groundwork: Engaging campus partners to develop readiness for change - Diana Garza, Cynthia Campbell, and Donna Llewellyn, Boise State University* - Slides
10:30 AM-11:00 AM PT/ 11:30 AM-12:00 PM MT/ 12:30 PM-1:00 PM CT/ 1:30 PM - 2:00 PM ET	<p>Break/Open virtual room for networking. <i>Participants can take this time to recharge, get food, check their email, and play with their pets, or they can join their colleagues in an open virtual room for informal discussion.</i></p>
11:00 AM-11:30 AM PT/ 12:00 PM-12:30 PM MT/ 1:00 PM-1:30 PM CT/ 2:00 PM - 2:30 PM ET	<p>Keynote Address: Fostering Systemic Change for Advancing DEI: What Leaders Can Do</p> <ul style="list-style-type: none"> • Susan Elrod, Chancellor at Indiana University South Bend Chancellor Elrod will share emerging work on building leadership capacity for systemic institutional change projects. A change leadership system model will be presented along with information and resources about what leaders at all levels can do to facilitate the success and sustainability of change initiatives on campuses. This interactive session will engage centers in highlighting the ways that they lead change and work together with other leaders in a systems model approach. - Susan Elrod - Leadership Moves PDF Slides • Moderator: Gabriela Weaver, Professor in Chemistry and Special Assistant to the Provost for Educational Initiatives, UMass Amherst
11:30 AM-11:40 AM PT/ 12:30 PM-12:40 PM MT/ 1:30 PM-1:40 PM CT/ 2:30 PM - 2:40 PM ET	Transition
11:40 AM-12:10 PM PT/ 12:40 PM-1:10 PM MT/	Small group discussion on ways center and program directors and staff lead change.

1:40 PM-2:10 PM CT/ 2:40 PM - 3:10 PM ET	<p>Links needed:</p> <ol style="list-style-type: none"> 1. Susan Elrod - Leadership Moves PDF 2. Centers and Leadership Moves Handout
12:10 PM-12:30 PM PT/ 1:10 PM-1:30 PM MT/ 2:10 PM-2:30 PM CT/ 3:10 PM - 3:30 PM ET	<p>Report out from small group discussions on ways center and program directors and staff lead change.</p> <p>All group report out notes are here.</p>
12:30 PM-12:40 PM PT/ 1:30 PM-1:40 PM MT/ 2:30 PM-2:40 PM CT/ 3:30 PM - 3:40 PM ET	Transition
12:40 PM-1:20 PM PT/ 1:40 PM-2:20 PM MT/ 2:40 PM-3:20 PM CT/ 3:40 PM - 4:20 PM ET	<p>Virtual Showcase Session I – Organized by Strands <i>Participants can choose one of five virtual presentations. Each session has two presenters who will present for 3-5 minutes each. Participants will have the remaining time to ask questions and engage in discussion. Choose your session in the Concurrent and Showcase Session Selection.</i></p> <ol style="list-style-type: none"> 1. Breakout Room 1 - Broadening Participation/Partnerships Beyond the University <ul style="list-style-type: none"> - Fostering Change to Embrace STEM Education at a STEM-focused Institution - Katherine Chen and Arthur Heinricher, Worcester Polytechnic Institute - Slides, Slides with Notes, Video* - A University STEM Center's Role in Advancing Enthusiasm, Equity & Excellence in P-16 STEM - Madhura Kulkarni, Northern Kentucky University* - Slides 2. Breakout Room 2 <ul style="list-style-type: none"> - From Weeding to Cultivating - Inviting Shifts in Faculty Mindset Through Formative Assessment - Jessica Cleeves, University of Utah - Slides - Leveraging a STEM center's multi- and inter-disciplinary expertise to engage faculty - Ann Sitomer, Oregon State University* - Slides 3. Breakout Room 3 <ul style="list-style-type: none"> - STEM Education Centers and the Food-Energy-Water-Nexus: Building Capacity for Education and Research through Transdisciplinary Networks - Hui-Hui Wang, Purdue University - Slides - DBERs As Agents of Change - Gwen Shusterman, Portland State University*

	<p>4. Breakout Room 4 - Facilitating Change/Retention and Success</p> <ul style="list-style-type: none"> - Peer Mentoring Program Sparks STEM Revolution - Amber Miller, and Michalina Mrugala, University of St. Thomas, Houston - Slides, Video* - Success in College Science Courses Begins with Academic Language - Michalina Mrugala and Amber Miller, University of St. Thomas - Video* <p>5. Breakout Room 5 - Facilitating Change/Engaging Faculty</p> <ul style="list-style-type: none"> - Building the Foundation for Institutional Transformation Through Persistent and Strategic Faculty Engagement - Jordan Gerton and Emily Gaines, University of Utah - Slides* - Driving Change by Empowering Faculty with Data on Inclusion and Equity- Holly S. Godsey, Jordan Gerton and Allyson Rocks, University of Utah - Slides* <p>6. Breakout Room 6 –NSEC Showcases</p> <ul style="list-style-type: none"> - A Time of Disruption: Improving Community while Social Distancing – Bruce Evan Goldstein, University of Colorado Boulder - The Role of Centers: Disrupting the Status Quo while Stabilizing Initiatives in Undergraduate STEM Education - Deborah Carlisle, University of Massachusetts Amherst - Slides*
1:20 PM-1:35 PM PT/ 2:20 PM-2:35 PM MT/ 3:20 PM-3:35 PM CT/ 4:20 PM - 4:35 PM ET	<p>Reflections and Day 1 Wrap Up Discussion</p> <ul style="list-style-type: none"> • Moderator: Cynthia Ghent, Associate Professor and Director, STEM Education Center, Towson University
1:35 PM-2:00 PM PT/ 2:35 PM-3:00 PM MT/ 3:35 PM-4:00 PM CT/ 4:35 PM - 5:00 PM ET	<p>Break</p>
2:00 PM-3:00 PM PT/ 3:00 PM-4:00 PM MT/ 4:00 PM-5:00 PM CT/ 5:00 PM - 6:00 PM ET	<p>Special Session: How might we be allies in the fight to end racism?</p> <p>We invite all participants to join us in this session that continues the call to action by #ShutdownSTEM. This session is open to all participants who would like to continue to reflect on our roles in combating systemic oppression.</p>

Thursday, June 11, 2020

8:30 AM-9:00 AM PT/ 9:30 AM-10:00 AM MT/ 10:30 AM - 11:00 AM CT/ 11:30 AM - 12:00 PM ET	<p>Welcome and Orientation Day 2</p> <p>NSEC 2020 Slide Deck</p> <ul style="list-style-type: none"> Noah Finkelstein, Professor of Physics; Co-Director Center for STEM Learning, University of Colorado Boulder and Co-Director, Network of STEM Education Centers
9:00 AM-9:30 AM PT/ 10:00 AM-10:30 AM MT/ 11:00 AM-11:30 AM CT/ 12:00 PM - 12:30 PM ET	<p>Plenary Address:</p> <p>NSF's Mid-Scale Infrastructure Solicitation</p> <ul style="list-style-type: none"> Lee Zia, Deputy Division Director for Division of Undergraduate Education at the National Science Foundation Dr. Zia will present on NSF's midscale infrastructure program. Moderator: Noah Finkelstein, Professor of Physics; Co-Director Center for STEM Learning, University of Colorado Boulder and Co-Director, Network of STEM Education Centers <p>Slides</p>
9:30 AM-10:00 AM PT/ 10:30 AM-11:00 AM MT/ 11:30AM-12:00 PM CT/ 12:30 PM - 1:00 PM ET	<p>Small group discussions on needed shared infrastructure for the education research and reform community.</p> <p>Link needed: Needed Educational Infrastructure Handout</p>
10:00 AM-10:30 AM PT/ 11:00 AM-11:30 AM MT/ 12:00 PM-12:30 PM CT/ 1:00 PM - 1:30 PM ET	<p>Report out</p> <p>Group report out notes are here</p>
10:30 AM-11:00 AM PT/ 11:30 AM-12:00 PM MT/ 12:30 PM-1:00 PM CT/ 1:30 PM - 2:00 PM ET	<p>Break/Open virtual room for networking. <i>Participants can take this time to recharge, get food, check their email, and play with their pets, or they can join their colleagues in an open virtual room for informal discussion.</i></p>
11:00 AM-11:15 AM PT/ 12:00 PM-12:15 PM MT/ 1:00 PM-1:15 PM CT/ 2:00 PM – 2:15 PM ET	<p>General Session and Transition into Concurrent Session II</p>
11:15 AM-11:45 AM PT/ 12:15 PM-12:45 PM MT/	<p>Concurrent Session II</p>

1:15 PM-1:45 PM CT/ 2:15 PM - 2:45 PM ET	<p><i>Participants can choose one of three virtual presentations. Choose your session in the Concurrent and Showcase Session Selection. Abstracts are in the NSEC 2020 Program Guide.</i></p> <ol style="list-style-type: none"> 1. Documenting improvements in undergraduate student retention and student success as a result of an innovative and faculty-led program to improve STEM teaching and learning across a university campus - Laura Millay, University of Maine 2. The STEM Center as Institutional Change Agent: Bringing Faculty and Administration Together to Increase the Use of High-Impact Practice - Christopher Moore, Christine Cutucache, and; Tracie Reding, University of Nebraska Omaha slides 3. Transforming team-based active learning with student feedback (and the collaborative efforts that facilitate change) - Tekla Nicholas, Florida International University
11:45 AM-12:00 PM PT/ 12:45 PM-1:00 PM MT/ 1:45 PM-2:00 PM CT/ 2:45 PM - 3:00 PM ET	General Session and Transition
12:00 PM-12:40 PM PT/ 1:00 PM-1:40 PM MT/ 2:00 PM-2:40 PM CT/ 3:00 PM - 3:40 PM ET	<p>Virtual Showcase Session II</p> <p><i>Participants can choose one of five virtual presentations. Each session has two presenters who will present for 3-5 minutes each. Participants will have the remaining time to ask questions and engage in discussions. Choose your session in the Concurrent and Showcase Session Selection.</i></p> <ol style="list-style-type: none"> 1. Breakout Room 1 - Facilitating Change <ul style="list-style-type: none"> - Applying an Emerging Model of Instructional Change Teams to Improve Team Outcomes - Charles Henderson and Andrea Beach, Western Michigan University - How team composition matters for systemic change - Kate White, Western Michigan University; Audrey Boklage, University of Texas at Austin. Handout. Slides. 2. Breakout Room 2 - Engaging Faculty/Facilitating Change <ul style="list-style-type: none"> - The Faculty Online Learning Community Model to support STEM faculty development - Alexandra C Lau, University of Colorado Boulder - Slides, Video - A Toolkit for Promoting and Implementing Tools for Scholarly Teaching Evaluation - Fatemeh (Dena) Rezaei and Sarah Andrews, University of Colorado Boulder - Slides 3. Breakout Room 3 - Facilitating Change/Managing a Center <ul style="list-style-type: none"> - Using a six-level framework to evaluate the impact of our center on faculty, students, and institutional

	<p>transformation - Shanna Shaked, Erin Sanders O'Leary, Jess Gregg, and Rachel Kennison, UCLA</p> <ul style="list-style-type: none"> - A novel SEC model for building communities that both disrupt and stabilize local STEM education - John Morelock, University of Georgia - Slides, Video - Related slide presentation from Sharon Locke, Southern Illinois University Edwardsville <p>4. Breakout Room 4 - Retention and Success/Facilitating Change</p> <ul style="list-style-type: none"> - Engaging Faculty to Facilitate Change through Experiential Learning - Ellene Tratras Contis and Batoul Abdallah, Eastern Michigan University - Slides; Program Description - Enhancing the Design of Gateway Experiences (EDGE) Grant - Timothy Scott, Texas A&M University - Slides <p>5. Breakout Room 5 – Engaging Faculty</p> <ul style="list-style-type: none"> • STEM Centers and disciplinary professional society partnerships to facilitate SoTL-supported change - Kathleen Quardokus Fisher, Florida International University; Ann Sitomer, Oregon State University - Handout - Student Values and Experiences across a Consortium of Universities: Sharing data with Faculty and Administration to Inform Change - Patrick Sheehan, University of Maryland; Katerina Thompson, University of Maryland; Gili Marbach-Ad, University of Maryland - Video, Handout <p>6. Breakout Room 6 - Facilitating Change/Improving Education</p> <ul style="list-style-type: none"> - Advancing Improvement in STEM Education through Organizational Change Networks - Susan Rundell Singer, Rollins College; Ann Austin, Michigan State University - Slides
12:40 PM-12:45 PM PT/ 1:40 PM-1:45 PM MT/ 2:40 PM-2:45 PM CT/ 3:40 PM – 3:45 PM ET	Transition
12:45 PM-1:15 PM PT/ 1:45 PM-2:15 PM MT/ 2:45 PM-3:15 PM CT/ 3:45 PM - 4:15 PM ET	<p>How Centers are Supporting COVID-related Changes on Campus</p> <p><i>Participants will share ways their centers and programs have been supporting the immediate needs of students, faculty, and staff. We will surface areas of concern for managing educational reforms in the future.</i></p>

	<p>Moderator: Donna Llewellyn, Executive Director, Institute for STEM and Diversity Initiatives, Boise State University</p> <p>Link needed: Padlet for How Centers are Supporting Campuses</p>
<p>1:15 PM-1:30 PM PT/ 2:15 PM-2:30 PM MT/ 3:15 PM-3:30 PM CT/ 4:15 PM - 4:30 PM ET</p>	<p>Reflections and Wrap Up</p> <ul style="list-style-type: none"> Moderator: Ken Griffith, Director – STEM Teaching, Engagement & Pedagogy (STEP) Program, Teaching, Learning & Professional Development Center (TLPDC); Instructor – Department of Biological Sciences, Texas Tech University <p>NSEC 2020 Slide Deck</p>
<p>1:30 PM-2:00 PM PT/ 2:30 PM-3:00 PM MT/ 3:30 PM-4:30 PM CT/ 4:30 PM - 5:00 PM ET</p>	<p>Optional Session: What did we learn from running a virtual conference. Join Kacy to see how the sausage was made.</p> <p>All group report out notes are here.</p>

Posters

Formative Peer Observation for Instructional Change

Authors: Heather Dillon; Stephanie Salomone; Carolyn James; Valerie Peterson; Tara Prestholdt; Eric Ancil, University of Portland - [Video](#)

National Collaborative for Research on Food, Energy, and Water Education (NC-FEW)

Authors: Cory T Forbes, University of Nebraska-Lincoln; Hannah H Scherer, Virginia Tech; Hui-Hui Wang, Purdue University; Nicole Sintov, The Ohio State University - [Slides](#), [Audio](#)

Using a Multi-level Network Model to Inform Center Management

Authors: Tracie Reding, University of Nebraska Omaha; Elliott Ostler, University of Nebraska Omaha; Christine Cutucache, University of Nebraska Omaha; Chris Moore, University of Nebraska Omaha - [Poster](#)

Rethinking the Effort to Implement Creative Strategies for Driving Student Engagement and Success in STEM

Authors: Charles H. Roberts, Mercer University; Zipangani Vokhiwa, Mercer University - [Slides](#)

Using Professional Development to Support Equitable Learning Opportunities in STEM Lab Settings

Authors: Ruthmae Sears, University of South Florida; Robert Potter, University of South Florida; Gerry Meisels, University of South Florida; Kelley Schuler, University of South Florida - [Slides](#); [Video](#)

Comprehensive broader impacts via the UNO STEM TRAIL Center: Spotlight on NE STEM 4U

Authors: Nikolaus Stevenson, University of Nebraska at Omaha; Amanda Shultz, University of Nebraska at Omaha; Maggie Kehler, University of Nebraska at Omaha; Caelyn Armshaw, University of Nebraska at Omaha; Katie Slobodnik, University of Nebraska at Omaha; William Tapprich, University of Nebraska at Omaha; Neal Grandgenett, University of Nebraska at Omaha; Christine Cutucache, University of Nebraska at Omaha - [Slides](#), [Video](#)

Leadership through STEM Community Engagement

Authors: David Devraj Kumar, Florida Atlantic University - [Slides](#)

Gateways-ND: 5 Years of Creating Pathways to Institutional Change with STEM Faculty Development

Authors: Jill Motschenbacher, North Dakota State University; James Nyachwaya, North Dakota State University; Lisa Montplaisir, North Dakota State University; Jared Ladbury, Minnesota State University; and Emily Berg, North Dakota State University

Molding great teachers out of STEM-focused graduate students through mentored practice

Authors: Benjamin L. Wiggins, University of Washington in Seattle; Richard G. Gardner, University of Washington in Seattle; Rebecca M. Price, University of Washington Bothell; Elaine R. Klein, University of Washington in Seattle; Shelley Stromhold, University of Washington in Seattle

Using Flipped Learning with Peer Assessment to Improve Student Microscopy Skills in Gateway Biology Courses

Authors: Adijat Adebola, Bronx Community College, CUNY, Raffaella Diotti, Bronx Community College, CUNY; Goldie Sherr, Bronx Community College, CUNY - [Slides](#)

Positive Effects of Active Learning Strategies on Students' Achievements

Authors: Elizabeth Lugosi, The University of Arizona; Guillermo Uribe, Data Analyst, The University of Arizona - [Slides](#)

Acknowledgements

Thank you!

The NSEC 2020 National Conference could not happen without the leadership of the conference planning committee. We thank them for their invaluable help. We also thank the NSEC Steering Committee, Advisory Board, and our evaluator, Nancy Shapiro, for their guidance.

NSEC 2020 National Conference Planners

Cynthia Ghent (co-chair), Towson University
Ken Griffith (co-chair), Texas Tech University
Ruthmae Sears (co-chair), University of South Florida
Adrienne Bentz, Texas A&M University
Cynthia Ghent, Towson University
Theresa Hopkins, University of Tennessee
Laird Kramer, Florida International University
Donna Llewellyn, Boise State University

Timothy Scott, Texas A&M University
Gwen Shusterman, Portland State University
Alice Steimle, The University of Mississippi
Zipangani Vokhiwa, Mercer University
Kacy Redd, Association of Public and Land-grant Universities
Noah Finkelstein, University of Colorado at Boulder

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- John Rand, University of Hawai'i System
- Charles Roberts, Penfield College of Mercer University
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- Linda Slakey, AACU, AAU and APLU
- Pratibha Varma-Nelson, Indiana University-Purdue University Indianapolis

Evaluator

Nancy Shapiro, Associate Vice-Chancellor for Academic Affairs & Special Assistant to Chancellor, University System of Maryland

NSEC Speaker Bios



Andrea L. Beach is a Professor of Higher Education Leadership and Co-Director of the Center for Research on Instructional Change in Postsecondary Education (CRICPE) at Western Michigan University. She founded and was Director of the Office of Faculty Development at WMU from 2008-2015. She received her Master's degree in Adult and Continuing Education and her PhD in Higher, Adult, and Lifelong Education (HALE) from Michigan State University in 1998 and 2003, respectively. Her research centers on organizational change in higher education, support of innovation in teaching and learning, faculty learning communities, and faculty development as a change lever. She is a co-author of *Creating the Future of Faculty Development: Learning from the Past, Understanding the Present* (Sorcinelli, Austin, Eddy & Beach, 2006), and is lead author on a 10-year follow-up to that work, *Faculty Development in the Age of Evidence: Current Practices, Future Imperatives* (Beach, Sorcinelli, Austin & Rivard, 2016). She has been PI and co-PI on several NSF-funded grants focused on instructional change strategies that have produced articles and book chapters on instructional change strategies, as well as instruments to self-report instruction and academic department climate for instructional improvement. She is most recently director of a \$3.2 million project funded by the US Department of Education's First in the World program to undertake, document, and measure outcomes of institutional transformation aimed at improving the persistence and academic success of students from low-income backgrounds.



Susan Elrod began as the sixth chancellor of Indiana University South Bend in June 2019. As Chancellor, she leads IU South Bend, a regional campus of Indiana University, in fulfilling its mission as the only public comprehensive university serving the communities of Northcentral Indiana. IU South Bend is proud to offer educational opportunities to a range of students seeking to learn, grow and transform their lives and the lives of those around them. Prior to this position, she has served as a provost, dean and in various academic leadership positions at public comprehensive universities in the California State University System and the University of Wisconsin system. She also worked for the Association of American Colleges & Universities in Washington, DC. Her leadership track record includes strategic planning and enrollment management, faculty development, improving faculty diversity, enhancing support for research, and building campus wide initiatives that increase student access, persistence and completion. She holds a Ph.D. in Genetics and has nearly 20 publications on topics ranging from undergraduate research and to systemic change and leadership, as well as several scientific publications and patents. She is a nationally recognized leader in STEM higher education on projects centered on leadership of institutional systemic change in

higher education as a scholar, leader, project advisor, and consultant. She regularly publishes on topics at the intersection of her research interests and her experiences as an administrative leader in higher education. Her latest projects are focused on building leadership capacity for systemic change and a book on *Shared Leadership in Higher Education: Responding to a Changing World*, forthcoming from Stylus, with co-editors Judith Ramaley, Adrianna Kezar and Elizabeth Holcombe. Other recent engagements include co-leader of the Accelerating Systemic Change Network's Systemic Change Institute, advisor to the Mathematics Teacher Education Partnership project, founder of the inaugural Gordon Research Conference on Undergraduate Biology Education Research, founding member of the national Coalition for Reform in Undergraduate STEM Education (CRUSE) and member of a National Research Council committee report on *Indicators for Monitoring Undergraduate STEM Education*. She was also recently elected as a Fellow of the American Association for the Advancement of Science (AAAS).



Charles Henderson is a Professor at Western Michigan University (WMU), with a joint appointment between the Physics Department and the WMU Mallinson Institute for Science Education. He is the Director of the Mallinson Institute and co-Founder and co-Director of the WMU Center for Research on Instructional Change in Postsecondary Education (CRICPE). His research program focuses on understanding and promoting instructional change in higher education, with an emphasis on improving undergraduate STEM instruction. Dr. Henderson's work has been supported by over \$9M in external grants and has resulted in many publications (see <https://sites.google.com/view/chenderson>). He is a Fulbright Scholar and a Fellow of the American Physical Society. Dr. Henderson is the senior editor for the journal *Physical Review Physics Education Research* and has served on two National Academy of Sciences Committees: Undergraduate Physics Education Research and Implementation, and Developing Indicators for Undergraduate STEM Education.



Kate White is the ASCN Research Director and a Postdoctoral Research Associate at CRICPE. Her research interests include institutional change, team-based change, evidence-based teaching and learning, environmental effects on learning, bilingualism, and second language teaching and learning. She earned her Ph.D. from the Ohio State University (2015) in Slavic linguistics and second language studies.



Shadra Smith, is an Associate Dean of Students at The College of Wooster. As a member of the Dean of Students staff, she supports students holistically via case management, resource referral and partnerships with the internal and external Wooster community. For over 2 years Ms. Smith led the newly revised, Center for Diversity & Inclusion (CDI). CDI encompasses 5 “branches” including, Civic & Social Responsibility (dissolved in 2019), Sexuality & Gender Inclusion, International Student Services, Religious & Spiritual Life and Multicultural Student Affairs. All branches, led and supported by 10 professional staff members, work singularly and collectively to support the diverse intersectional identities of Wooster’s student population. Prior to the revision, Shadra co-coordinated and wrote the institution’s

first diversity, equity & inclusion (DEI) strategic plan. This plan led to the hiring of the college’s first Chief DEI officer staff in June 2019. Throughout her five years at Wooster, Shadra has collaborated with almost all areas within the college, and specifically has been involved with the retention and success of underrepresented STEM student populations. Via the STEM Success Initiative (SSI), the college has created a variety of STEM student focused outreach, academic support and experiential learning opportunities. In January 2020, Shadra presented with colleagues at the American Conference of Academic Deans (ACAD). *Walk the Talk: A Cross-Divisional Approach to Institutionalizing Diversity at The College of Wooster* session focused on how colleges can design and implement a cross-divisional approach to institutionalizing equity and inclusion to address campus climate concerns and improve recruitment, retention, and mentoring of underrepresented faculty, staff, and students. Shadra resides in Wooster, OH with her awesome artistic 8 year old son, her pony-tail wearing shih tzu Miko, and snuggly 18 lb cat Zeus. She enjoys the moments of fellowship with new or old friends, gardening and cooking.



Lee Zia, Deputy Division Director for Division of Undergraduate Education at the National Science Foundation. Lee Zia is the Deputy Division Director for DUE. He served as the Lead Program Director for the NSF National Science, Mathematics, Engineering, and Technology Education Digital Library (NSDL) Program from its inception in FY 2000 to its sunsetting in FY 2010. He served as a "rotator" in the NSF Division of Undergraduate Education during calendar years 1995 and 1996 while on leave from the Department of Mathematics at the University of New Hampshire. Zia rejoined the NSF as a permanent staff member in the fall of 1999. From November 2008 to December 2009, he served as a Commerce Science and Technology Fellow in

the Office of Senator John D. Rockefeller IV. Most recently he served as the Lead Program Director for the STEM Talent Expansion Program (STEP). Zia holds degrees in mathematics from the University of North Carolina (B.S.) and the University of Michigan (M.S.), and applied mathematics from Brown University (Ph.D.).

Concurrent Session I Abstracts

Models, tools, and resources for engaging departments in transforming their teaching evaluation systems

Session: Concurrent Session

Speakers: Sarah Andrews, University of Colorado Boulder

Additional Authors: Alanna Pawlak, University of Colorado Boulder; Dena Rezaei, University of Colorado Boulder; Jessica Keating, University of Colorado Boulder; Mark Gammon, University of Colorado Boulder; Noah Finkelstein, University of Colorado Boulder

Strands: Facilitating Change; Improving the Quality of Education; Research

Abstract: Undergraduate teaching evaluation systems often poorly measure teaching effectiveness and lack processes for formative development of teaching quality. In response to these concerns, the Teaching Quality Framework Initiative (TQF), a Center for STEM Learning project at the University of Colorado Boulder, is creating a process for transformation of teaching evaluation toward a more scholarly and evidence-based approach. The TQF, as part of the Bay View Alliance and multi-institution TEval collaboration, focuses on teaching evaluation in order to improve instruction and enhance student outcomes, among other long-term institutional objectives. Departmental-level and stakeholder meetings are combined with outreach to administrative officials and cross-departmental sharing of resources to create campus-wide change. We present tools and processes associated with departmental-level and campus-level change, explore how departments move through this process, share example tools developed by teams, and engage in conversations around mechanisms to create sustainable campus-wide change and disseminate tools/processes beyond our campus.

Instructors' Diverse and Changing Ideas About Inclusive Teaching

Session: Concurrent Session

Speakers: Glen Davenport, Yale University; Leo Chen, Yale University

Additional Authors: Meghan Bathgate, Yale University Poorvu Center for Teaching and Learning; Jennifer Claydon, Yale University; Leo Chen, Yale University Poorvu Center for Teaching and Learning

Strands: ; Broadening participation/Inclusive Education; Research; Engaging Faculty

Abstract: As discussions on inclusive teaching become more frequent in STEM education, it is important to periodically examine the current understanding of 'inclusivity' among the instructors that we serve. Our study examines how STEM instructors define inclusive teaching prior to attending a one-week pedagogical training session. By coding 650 open-ended responses across four years, we found that faculty awareness of inclusive teaching is increasing rapidly. At the same time, faculty do not appear to have converged on a single definition of inclusive teaching. Their definitions and examples varied widely, which we organized into seven categories, perhaps serving as a starting point for a taxonomy of inclusive teaching. The results we present during this session are important for professionals who

develop and run faculty training initiatives, those who will need to develop a common dialogue about inclusive practices, and for those who need to respond to changing faculty needs.

Laying the groundwork: Engaging campus partners to develop readiness for change

Session: Concurrent Session

Speakers: Diana Garza, Boise State University; Cynthia Campbell, Boise State University; Donna Llewellyn, Boise State University

Additional Authors: Diana Garza, Boise State University; Cynthia Campbell, Boise State University; Donna Llewellyn, Boise State University; Susan Shadle, Boise State University

Strands: Facilitating Change; Improving the Quality of Education; Engaging Faculty

Abstract: We recently embarked on a process aimed at laying the groundwork for systemic change around diversity, equity, and inclusion on our campus. We worked intentionally to make this an inclusive process, explicitly taking into account the common challenges of working together in diverse teams. This session will (a) explore the intentional choices our team made to ensure this process was inclusive, (b) describe our approaches to engage faculty, staff, and administration at all levels across campus in our planning process, and (c) provide participants with the opportunity to brainstorm and plan for how they could achieve the same goals at their home institutions.

Concurrent Session II Abstracts

Documenting improvements in undergraduate student retention and student success as a result of an innovative and faculty-led program to improve STEM teaching and learning across a university campus

Session: Concurrent Session

Speakers: Laura Millay, University of Maine

Additional Authors: Natasha Speer, University of Maine; Susan McKay, University of Maine; Sara Lindsay, University of Maine; Erin Vinson, University of Maine; MacKenzie Stetzer, University of Maine; Mitchell Bruce, University of Maine

Strands: Facilitating Change; Retention and Success

Abstract: Documenting impacts related to undergraduate student retention and student success as a result of successful and innovative, faculty-led programs to improve STEM teaching and learning can play a key role in gaining support to sustain these programs. But gathering credible statistical evidence of success is challenging in the midst of complex educational systems. For several years, the Maine Center for Research in STEM Education (RiSE Center) at the University of Maine has been working with faculty to rigorously document impacts of a campus-wide faculty-led program that uses evidence-based practices to improve STEM learning for undergraduates. Based on findings of improved student retention and success, the University has supported sustaining the program beyond the original grant funding and is currently considering options to expand the program to non-STEM courses and additional campuses. In this presentation, we will share and discuss our findings, limitations, and process of rigorously investigating program impacts.

The STEM Center as Institutional Change Agent: Bringing Faculty and Administration Together to Increase the Use of High-Impact Practices

Session: Concurrent Session

Speakers: Christopher Moore, University of Nebraska Omaha; Christine Cutucache, University of Nebraska Omaha; Tracie Reding, University of Nebraska Omaha; , ;

Additional Authors:

Strands: Facilitating Change; Assessment; Engaging Faculty

Abstract: The UNO STEM TRAIL Center is facilitating institutional change by leading a multi-unit assessment effort of teaching practices. Specifically, we are using a Concerns-Based Adoption Model (CBAM) as the basis for acquiring data about the use of high-impact teaching practices (HIPs) in general education science and mathematics courses on campus and in local dual-enrollment courses. The project is determining the types and prevalence of research-verified HIPs, and identify faculty concerns and barriers to their adoption. Gathered metrics are allowing campus leaders to allocate resources based on need, potential for measurable impact, and in a manner that addresses faculty concerns. This is resulting in the efficient allocation of resources with faculty input, indirectly resulting in improved learning outcomes for over 9,000 undergraduate and 1,500 high school students per year. We will

discuss the change model, how we achieved faculty and administrative buy-in to the project through team-building, and preliminary results.

Transforming team-based active learning with student feedback (and the collaborative efforts that facilitate change)

Session: Concurrent Session

Speakers: Tekla Nicholas, Florida International University

Additional Authors: Sat Gavassa Becerra, Florida International University; Sarah Eddy, Florida International University

Strands: Facilitating Change; Retention and Success; Improving the Quality of Education

Abstract: Team-based active learning has become an important strategy for improving student engagement and learning in undergraduate STEM courses. Through these pedagogical methods, students may benefit by discussing, explaining, cooperating, and collaborating in ways that lead to a deeper conceptual understanding of the course material. But group activities don't always result in the deep engagement we hope for. At Florida International University, feedback from student surveys helps faculty to improve the effectiveness of classroom activities. Iterative cycles of research and faculty response in STEM courses have created a climate of continuous improvement and increasing levels of student success. In this session we discuss our process of using research to facilitate change, the obstacles to learning group effectiveness, and strategies for designing team-based activities that enhance academic outcomes, social integration, and student satisfaction.

Virtual Showcase I Abstracts

Location: Breakout Room 1 - Broadening Participation/Partnerships Beyond the University

Fostering Change to Embrace STEM Education at a STEM-focused Institution

Session: Showcase

Speakers: Katherine Chen, Worcester Polytechnic Institute; Arthur Heinrich, Worcester Polytechnic Institute

Additional Authors:

Strands: Facilitating Change; Broadening participation/Inclusive Education; Partnerships Beyond the University

Abstract:With many robust, isolated STEM programs at Worcester Polytechnic Institute (WPI), how do we approach facilitating change to improve STEM education as a whole? The STEM Education Center and Undergraduate Studies at WPI seek to foster a Collaborative for Transformative STEM Education at WPI that brings together existing programs and cultivates new initiatives as a collective entity to promote STEM education as a discipline. Navigating current organizational structures and priorities, we encourage and support emergent STEM education initiatives that challenge and blur the self-imposed boundaries of traditional disciplines, faculty research vs. teaching demands, and the PreK-12 and higher education demarcation. Examples to be shared include the multiple intersections among PreK-12 teacher development, inclusive pedagogy, project-based learning, scholarship of teaching and learning, equity in education, and purpose-driven education research. Building off our strengths and harnessing emergent, transdisciplinary efforts can shift the framing of what, who, and how we do STEM education.

Location: Breakout Room 1 - Broadening Participation/Partnerships Beyond the University

A University STEM Center's Role in Advancing Enthusiasm, Equity & Excellence in P-16 STEM

Session: Showcase

Speakers: Madhura Kulkarni, Northern Kentucky University

Additional Authors: Ashley Vaughn, Northern Kentucky University

Strands: Facilitating Change; Broadening participation/Inclusive Education; Partnerships Beyond the University

Abstract:Northern Kentucky University's Center for Integrative Natural Science and Mathematics (CINSAM) promotes enthusiasm, equity and excellence in STEM teaching, learning and scholarship at P-16 levels. CINSAM's structure, history, and positioning have allowed it to thrive and support our university stakeholders through this mission. We will discuss how CINSAM leads and facilitates collective action across 6 departments and 3 colleges as well as the P-16 ecosystem in our region. We will also examine how the center plays both disruptive and stabilizing roles at the university and in STEM teacher professional learning to both enable change and support new norms. CINSAM's successes include institutionalizing successful NSF-

funded programs (e.g. early research experiences that increase retention in STEM) and creating a research-informed and school-embedded professional learning experience that is "by teachers, for teachers". Challenges include adapting programs for new educational landscapes and securing buy in when collaborators are stretched thin.

Location: Breakout Room 2. Assessment

From Weeding to Cultivating - Inviting Shifts in Faculty Mindset Through Formative Assessment

Session: Showcase

Speakers: Jessica Cleeves, University of Utah

Additional Authors:

Strands: Broadening participation/Inclusive Education; Assessment; Engaging Faculty

Abstract:After socioeconomic status, the most reliable predictor of student success is an instructor's belief that a student can learn. In early-career STEM courses, often faculty perceive their roles as gatekeepers to a discipline, rather than gate-openers. This identification is embodied in "weeder" courses, many of which are implicitly and/or explicitly built to exclude students based on features of academic culture that don't align with disciplinary mastery. This session will first explore the ideological myths which motivate "weeder" course culture, will offer a frame with which to approach faculty who don't yet think all of their students are capable, and then demonstrate how formative assessment can provide the evidence faculty need to see their students not only as capable sense-makers, but as crucial contributors.

Location: Breakout Room 2. Assessment

Leveraging a STEM center's multi- and inter-disciplinary expertise to engage faculty

Session: Showcase

Speakers: Ann Sitomer, Oregon State University

Strands: Engaging Faculty; Broadening participation/Inclusive Education

Abstract:The STEM Research Center at Oregon State University coordinates a professional learning program, InclusiveExcellence@OSU (IE@OSU). IE@OSU supports faculty members' learning about personal and structural biases that lead to negative student experiences and inequitable opportunities to learn and the creation of tools that create inclusive STEM learning spaces. IE@OSU engages both two- and four-year college faculty members in a one-year experience that begins with one-week Academy and continues through participation in a Professional Learning Community to further understand the intersection of social justice and STEM education. In this session, we highlight how our inter-disciplinary research center uniquely contributes to the development and implementation of IE@OSU by leveraging our expertise across postsecondary institution types and STEM disciplines, as well as the center's previous experience collaborating with a variety of entities, including OSU's Colleges of Science and

Engineering, Center for Teaching and Learning, Office of Institutional Diversity, and leaders at regional community colleges.

Location: Breakout Room 3 - Research/Partnerships Beyond the University

STEM Education Centers and the Food-Energy-Water-Nexus: Building Capacity for Education and Research through Transdisciplinary Networks

Session: Showcase

Speakers: Cory T Forbes, University of Nebraska-Lincoln; Hannah Scherer, Virginia Tech; Nicole Sintov, The Ohio State University; Hui-Hui Wang, Purdue University;

Additional Authors: Cory Forbes, University of Nebraska-Lincoln; Hannah H Scherer, Virginia Tech; Hui-Hui Wang, Purdue University; Nicole Sintov, The Ohio State University

Strands: ; Improving the Quality of Education; Research; Partnerships Beyond the University

Abstract: Institutions of higher education must take a leading role in supporting teaching and learning about global STEM-based challenges in the Food-Energy-Water-Nexus. The objective of this session is to identify and leverage the needs and priorities of the NSEC community as part of early stages of the National Collaborative for Research on Food, Energy, and Water Education (NC-FEW), a NSF-funded Research Coordination Network involving postsecondary faculty from a diverse array of disciplinary backgrounds. Emerging from a NSEC RAC, NC-FEW will catalyze sustained, systemic, and interdisciplinary research on STEM education efforts grounded in FEW systems. In this workshop, we will engage the NSEC community by providing an overview of NC-FEW, facilitating small-group and panel-led discourse about the role of STEM education centers, and showcasing programmatic successes. Expected outcomes include distillation and identification of shared priorities and critical 'next steps' in efforts to engage STEM education centers in work focused on the FEW-Nexus.

Location: Breakout Room 3 - Research/Partnerships Beyond the University

DBERs As Agents of Change

Session: Showcase

Speakers: Gwen Shusterman, Portland State University

Additional Authors: Erin E. Shortlidge, Portland State University; Jack Barbera, Portland State University

Strands: Facilitating Change; Research; Broadening participation/Inclusive Education

Abstract: Seeded by an institutional Howard Hughes Medical Institute Science Education Grant, PSU has created a cohort of DBERs across science disciplines. Coincident with supportive leadership and existing infrastructure, the group of DBERs have provided leadership within departments for pedagogical changes, as well as, providing the local research data that appears to be so critical to engagement of faculty and institutional leaders. The interweaving of individual scholarly agendas with the campus change initiatives has been crucial to the changes underway. Importantly, the DBERs are providing invaluable research and assessment of

pedagogical and programmatic changes. Pathways to change will be shared in this example of "change through scholarship."

Location: Breakout Room 4 - Facilitating Change/Retention and Success

Peer Mentoring Program Sparks STEM Revolution

Session: Showcase

Speakers: Amber Miller, University of St. Thomas, Houston; Michalina Mrugala, University of St. Thomas, Houston

Additional Authors: Shivas Amin, University of St. Thomas, Houston

Strands: Facilitating Change; Retention and Success; Broadening participation/Inclusive Education

Abstract:At the University of St. Thomas, a small, liberal arts, Hispanic Serving Institution, a peer mentoring program sparked a STEM Revolution. Our peer mentor program is based on a partnership between faculty teaching freshman and sophomore level STEM courses and a qualified student (peer mentor), which creates an inclusive learning environment for the students taking these specific courses. As faculty realized the successes of the peer mentoring program, their buy-in increased, and many changed their strategies for encouraging students to attend peer mentoring. Participation in the peer mentoring program increased first year retention rates from 73% for students who did not attend any peer mentoring to 94% for students who attended sessions across an academic year. These students participating in peer mentoring also had increased cumulative GPAs compared to those students who did not attend any peer mentoring (3.18 to 2.65, respectively).

Location: Breakout Room 4 - Facilitating Change/Retention and Success

Success in College Science Courses Begins with Academic Language

Session: Showcase

Speakers: Michalina Mrugala, University of St. Thomas; Amber Miller, University of St. Thomas

Additional Authors: Shivas Amin, HSI-STEM Project Director

Strands: Facilitating Change; Retention and Success; Improving the Quality of Education; Broadening participation/Inclusive Education

Abstract:This presentation is a collaboration between ESL and STEM professionals at the University of St. Thomas (Houston). We will provide an overview of academic language services available to STEM students at our institution, especially focusing on ways for students to self-identify as students in need of academic language support, academic language best practices, and the overall student culture change. We will also share our success stories, such as improved global academic performance, more frequent and consistent student visits, and STEM faculty involvement. The goal of our presentation is to help other institutions implement academic language support and aid all learners in their life long pursuit of the STEM fields.

Location: Breakout Room 5 - Facilitating Change/Engaging Faculty

Building the Foundation for Institutional Transformation Through Persistent and Strategic Faculty Engagement

Session: Showcase

Speakers: Jordan Gerton and Emily Gaines, Center for Science & Mathematics Education, University of Utah

Additional Authors: Jordan Gerton, University of Utah; Emily Gaines, University of Utah

Strands: Facilitating Change; Improving the Quality of Education; Engaging Faculty

Abstract:Over the past five years, the Center for Science & Mathematics Education (CSME) at the University of Utah strategically leveraged existing faculty engagement activities - a lecture series and lunch-time seminar - to advance faculty dialog surrounding undergraduate education and to build support for new education initiatives. By deliberately selecting speakers and topics that aligned with a long-term agenda for change, CSME fostered discussions that led to increased buy-in and incremental culture change among faculty and departments. While this approach to change is gradual and subtle, it has been effective. Due in part to these efforts, CSME has built a community of engaged faculty members while also generating support for a new college-wide Learning Assistant program, a large-scale college-wide undergraduate research program, and a faculty DBER cluster bridging the College of Science and College of Education.

Location: Breakout Room 5 - Facilitating Change/Engaging Faculty

Driving Change by Empowering Faculty with Data on Inclusion and Equity

Session: Showcase

Speakers: Holly S. Godsey, University of Utah; Jordan Gerton, University of Utah; Allyson Rocks, University of Utah

Strands: Facilitating Change; Broadening participation/Inclusive Education; Engaging Faculty

Abstract:UPSTEM is a collaboration between the University of Utah and Salt Lake Community College and part of the Howard Hughes Medical Institute Inclusive Excellence program to promote institutional transformation around equity and inclusion in STEM. In 2019, UPSTEM conducted a survey of faculty, staff, and students to assess the "climate" of the College of Science for people from diverse backgrounds. The assessment yielded several nuanced findings that highlight opportunities for reflection and improvement. Faculty members participating in a yearlong Faculty Learning Community engaged in study and discussion of the findings and developed an action plan for the College of Science administration. As a result, many faculty have taken the initiative to lead their respective departments toward adopting inclusive policies and practices. This roundtable will present the processes that UPSTEM engaged in to promote discussion and elicit feedback regarding increasing institutional capacity to make data-driven decisions around inclusion.

Location: Breakout Room 6 – NSEC Showcases

A Time of Disruption: Improving Community while Social Distancing

Session: Showcase

Speakers: Bruce Evan Goldstein, CU Boulder

The Covid virus is not just contagious, its disruptive. Businesses, governments, cities, churches, universities, grocery stores, friends, families, lovers, competitive athletes - everyone and every organization - are all looking for ways to meaningfully and effectively conduct our work. We want our organizations to sustain their energy and commitment during the pandemic, even as we all hunker down in our home offices. But how do we maintain the enabling conditions for productivity, commitment, creativity, and purpose? Fortunately, best practices exist. People have been managing meaningful and impactful work remotely for many years, in large-scale collaborative learning networks like NSEC, NABI, ASCN and others. The weavers of these networks have timely ideas to share with us during this crisis. I will describe a few of these best practices that you can practice to enhance your STEM Center's potential for meaningful and generative remote work. These practices are drawn from my many years of theoretical and applied research into network best practices, as well as a series of online convenings I convened over the past two years with experienced network weavers to explore the challenges and opportunities of learning networks. These practices are grouped under three headings: 1) Promote Both Love and Discord, 2) Jumpstart Virtuous Cycles, and 3) Don't Age – Evolve Instead.

Location: Breakout Room 6 – NSEC Showcases

The Role of Centers: Disrupting the Status Quo while Stabilizing Initiatives in Undergraduate STEM Education

Session: Showcase

Speakers: Deborah Carlisle, University of Massachusetts Amherst

The mechanisms or levers through which innovations are implemented requires disruption of existing institutional norms, catalyzing new approaches, and stretching boundaries. It also requires stabilization for organizational norms to shift, and long term goals to be realized. Centers are positioned to work effectively in this space due to their multi-embedded programs, networks, and resources. Our research describes the complementary roles of SECs and CTLs, as a combination of disruption and stabilization, and explains how centers bring balance to reform efforts. We found educational innovations gain ground when championed by centers, and the mid-level organizational support they provide. For institutions seeking to transform undergraduate STEM education, SECs and CTLs offer an effective mechanism through the Disruptor/Stabilizer Support System. This showcase will share the key areas of this support system, describing center roles and opportunities.

Virtual Showcase II Abstracts

Location: Breakout Room 1 – Facilitating Change

Applying an Emerging Model of Instructional Change Teams to Improve Team Outcomes

Session: Showcase

Speakers: Charles Henderson, Western Michigan University; Andrea Beach, Western Michigan University

Additional Authors: Alice Olmstead, Texas State University; Diana Sachmpazidi, Western Michigan University; Amreen Nasim Thompson, Texas State University

Strands: Facilitating Change; Improving the Quality of Education; Engaging Faculty

Abstract: Team-based instructional change efforts in higher education involve groups of instructors and other stakeholders who meet regularly to work together on instructional change by revising existing courses, creating new courses, or making other instructional improvements within a department or an institution. Although there is extensive literature about teams in the contexts of hospitals, the military, and business, these findings are not necessarily applicable in the context of instructional change. This session will introduce attendees to an emerging research-based model of instructional change teams in higher education that is based on grounded theory research involving interviews with team leaders and team members of more than 30 instructional change teams. Attendees will be introduced to the model and will collaboratively work through how it can be used when initiating a new team or troubleshooting an existing team.

Location: Breakout Room 1 – Facilitating Change

How team composition matters for systemic change

Session: Showcase

Speakers: Kate White, Western Michigan University; Audrey Boklage, University of Texas at Austin

Additional Authors:

Strands: Facilitating Change

Abstract: The structure, connections, and interactions of a team pursuing a change initiative has long been of interest in higher education. The Systemic Change Institute is designed to support campus change agents in using institutional change strategies to advance projects and initiatives to greater scale and sustainability. Institute team members were interviewed about their involvement in change teams, roles, levels of engagement, decision-making processes, and interactions both inside and outside of their teams; the connections among team members and external stakeholders were explored using social network analysis. In this session, participants will use a boundary spanning framework to explore how two teams navigated systemic change and reflect and apply their learning to their own change projects.

Location: Breakout Room 2 - Engaging Faculty/Facilitating Change

The Faculty Online Learning Community Model to support STEM faculty development

Session: Showcase

Speakers: Alexandra C Lau, University of Colorado Boulder

Additional Authors: Edward Price, CSU San Marcos; Melissa Dancy, University of Colorado Boulder; Charles Henderson, Western Michigan University; Andy Rundquist, Hamline University; Chandra Turpen, University of Maryland; Fred Goldberg, San Diego State University; Adriana Cor

Strands: Facilitating Change; Research; Engaging Faculty

Abstract: There is considerable value in connecting faculty who teach in the same discipline, yet this can be a challenge for STEM education centers operating within a single college or university. We present a faculty online learning community (FOLC) model that connects people who are geographically separated, but share a common discipline to support their teaching development. We have developed two implementations of the FOLC model; in both, community members develop a strong sense of community and receive moral, practical, and pedagogical support while implementing various research-based teaching techniques. We will present our FOLC design and research on its impact on participants. We will then facilitate a discussion with the audience about the relevance of this model to STEM education centers for strengthening their programmatic offerings and as a tool for leveraging the affordances of other centers in their network.

Location: Breakout Room 2 - Engaging Faculty/Facilitating Change

A Toolkit for Promoting and Implementing Tools for Scholarly Teaching Evaluation

Session: Showcase

Speakers: Fatemeh (Dena) Rezaei, University of Colorado Boulder; Sarah Andrews, University of Colorado Boulder

Additional Authors: Sarah Andrews, University of Colorado Boulder; Alanna Pawlack, University of Colorado Boulder; Jessica Keating, University of Colorado Boulder; Mark Gammon, University of Colorado Boulder; Noah Finkelstein, University of Colorado Boulder

Strands: Facilitating Change; Improving the Quality of Education; Engaging Faculty

Abstract: We will discuss the development of a toolkit that provides guidelines and a suite of materials for individuals engaged in transforming teaching evaluation at the department level. The purpose is to provide practitioners with hands-on instruments and processes that they can adapt or utilize as they are. The toolkit provides a) directions on identifying or creating tools that better assess teaching quality, fill gaps within current evaluation practices, and align multiple measures from three key voices (peers, self, and students); b) guidance on designing procedures for use; and c) strategies for facilitating this work. We will start with the introduction of a preliminary version of the toolkit and general approach to transforming teaching evaluation. We

will then engage in collective discussion about how the toolkit can be applied, with particular focus on challenges and opportunities faced in the process.

Location: Breakout Room 3 - Facilitating Change/Managing a Center

Using a six-level framework to evaluate the impact of our center on faculty, students, and institutional transformation

Session: Showcase

Speakers: Shanna Shaked, UCLA; Erin Sanders O'Leary, UCLA; Jess Gregg, UCLA; Rachel Kennison, UCLA;

Additional Authors:

Strands: Facilitating Change; Improving the Quality of Education; Managing a Center

Abstract: Program evaluation is central to the development and evolution of a teaching and learning center. Drawing upon research in educational and organizational development (Kirkpatrick, 1998; Guskey 2000; Marbach-Ad et al., 2015; Beach et al. 2016; ACE 2017, AAU 2017), CEILS has embraced a six-level framework for evaluating the impact of our programming and services over the past five years, and together these data have been used to shape our strategic planning for the next five years. The six levels of our framework are listed below, along with an overview of assessment: 1. Participation: attendance records, Fall 2019 survey of faculty, and analyses of departmental breadth (percentage of faculty engaged) and depth (average hours of engagement). 2. Change in affective measures: post-event surveys and the Fall 2019 survey of faculty 3. Knowledge/skills attainment: Same as #2. 4. Change in teaching practice: Fall 2019 survey of faculty. 5. Student outcomes: enrollment of students in courses taught by CEILS-engaged faculty; formative and summative assessments of student learning. 6. Change in institutional culture: Fall 2019 survey of campus partners, service of CEILS staff on institutional committees, and analysis of breadth of CEILS programming among four quadrants of the framework by Henderson, Beach and Finkelstein (2011).

Location: Breakout Room 3 - Facilitating Change/Managing a Center

A novel SEC model for building communities that both disrupt and stabilize local STEM education

Session: Showcase

Speakers: John Morelock, University of Georgia

Additional Authors: Joachim Walther, University of Georgia; Nicki Sochacka, University of Georgia

Strands: Facilitating Change; Engaging Faculty; Managing a Center

Abstract: The NSEC recently published an article summarizing how SECs and CTLs often complement one another, the former playing a disrupting role in STEM education and the latter playing a stabilizing role (Carlisle & Weaver, 2020). We found this article illuminating in its survey of the current SEC landscape, but noted that faculty were often portrayed as relatively

passive recipients of Center activities, rather than potential leaders of STEM education change. We present a novel SEC model for community-led change in the form of UGA's Engineering Education Transformations Institute (EETI). Since founding EETI three years ago, our leadership has built a portfolio of faculty development programming focused on building local engineering education communities. We leverage faculty expertise and interests to diffuse a culture of educational innovation throughout UGA's Engineering College. We hope to gather feedback from attendees regarding how our programming model might transfer to other institutional contexts. Carlisle, D. L., & Weaver, G. C. (2020). The Role of Centers: Disrupting the Status Quo While Stabilizing Initiatives in Undergraduate STEM. *Change: The Magazine of Higher Learning*, 52(1), 60-70. doi:10.1080/00091383.2020.1693852

Location: Breakout Room 4 - Retention and Success/Facilitating Change

Enhancing the Design of Gateway Experiences (EDGE) Grant

Session: Showcase

Speakers: Timothy Scott, Texas A&M University

Additional Authors: Debra Fowler, Texas A&M University

Strands: Facilitating Change; Retention and Success; Improving the Quality of Education

Abstract: The EDGE grant program is a partnership between the Office for Student Success and Center for Teaching Excellence. EDGE grants are offered to high enrollment courses that act as gateways for remaining in a major and as bottlenecks for student success due to relatively high percentages of non-passing course grades. The EDGE grant supports programs willing to participate in a faculty driven course design process, which includes alignment of the learning outcomes, assessments and teaching methods, as well as, analysis of the broader impact of the course within the overall curriculum. This process includes analysis of student data to identify knowledge and skill gaps that could be closed by implementing evidence-based teaching approaches that incentivize student learning (e.g., less lecture, low-stakes opportunities to employ practice, interleaving, problem-solving) and by implementing appropriate student learning assessments. The award is renewable for up to three years, dependent on annual progress.

Location: Breakout Room 4 - Retention and Success/Facilitating Change

Engaging Faculty to Facilitate Change through Experiential Learning

Session: Showcase

Speakers: Ellene Tratras Contis, , Eastern Michigan University; Batoul Abdallah, , Eastern Michigan University

Additional Authors: Ellene Tratras Contis, Eastern Michigan University; Batoul Abdallah, Eastern Michigan University

Strands: Facilitating Change; Retention and Success; Engaging Faculty

Abstract:Science, Technology, Engineering and Mathematics (STEM) programs that attract and sustain student interest feature learning that is experiential, investigative, hands-on, personally significant to both students and faculty, connected to other inquiries, and suggestive of practical application to students' lives. Such learning flourishes in a community in which faculty are committed equally to teaching, to maintaining their own intellectual vitality, and to partnering with students in learning, and in which institutional support for such a community exists. The CSIE (Creative Scientific Inquiry Experience) Program at Eastern Michigan University is involved in retaining and increasing the number of STEM graduates by including faculty professional development, student connectedness to the sciences and mathematics through academic service-learning, and curricular reform. Participants will share their own institutional experiences and strategies for recruiting and retaining their STEM majors, developing culturally relevant, community-based courses, and will explore ways for implementing such a program on their campuses.

Location: Breakout Room 5 – Engaging Faculty

Student Values and Experiences across a Consortium of Universities: Sharing data with Faculty and Administration to Inform Change

Session: Showcase

Speakers: Patrick Sheehan, University of Maryland; Cynthia Ghent, Towson University

Additional Authors: Jacqueline Bortiatynski, Penn State; Gili Marbach-Ad, University of Maryland; Katerina V. Thompson, University of Maryland; Lindsay Wheeler, University of Virginia

Strands: Facilitating Change; Assessment; Research

Abstract:Employers and researchers have identified gaps between desired workplace skills and the skills students develop during their undergraduate education. We collected data from graduating seniors from four universities (UMD, Penn State, Towson, UVA) to gauge the skills they value and how these relate to their majors, demographics, and educational experiences. Exploratory factor analysis of student values indicated that skills could be categorized into four factors, which we interpreted as Writing, Memorization, Research and Reasoning, and Collaboration. We used a structural equation model to examine the relationship among these four factors, student characteristics (major, university attended, and research experience), and teaching approaches experienced by students in the classroom. Our data show that educational experiences are associated with differences in students' values. Additionally, discipline-specific differences in values were observed. We will also describe how these data are used to guide discussions with faculty and administrators around improving undergraduate education.

Location: Breakout Room 5 – Engaging Faculty

STEM Centers and disciplinary professional society partnerships to facilitate SoTL-supported change

Session: Showcase

Location: TBD

Speakers: Kathleen Quardokus Fisher, Florida International University; Ann Sitomer, Oregon State University

Additional Authors: Stephanie Campo, Florida International University; Megan Breit-Goodwin, Anoka-Ramsey Community College

Strands: Facilitating Change; Research; Partnerships Beyond the University

Abstract: The mission of many STEM Centers is to make large-scale, long-lasting change to instructional practices in STEM. In this mini-concurrent session, we share research findings from our partnership with a professional society to initiate a Scholarship of Teaching and Learning (SoTL) professional development program for two-year college faculty. This partnership has given us a chance to explore psychological ownership of programs that are shared among institutions to support organizational change and to investigate scholarship by practitioners for practitioners in two-year colleges. We include guidelines for those interested in building psychological ownership of organizational programs and perspectives on SoTL's role in two-year colleges.

Location: Breakout Room 6 - Facilitating Change/Improving Education

Advancing Improvement in STEM Education through Organizational Change Networks

Session: Showcase

Speakers: Susan Rundell Singer, Rollins College; Ann Austin, Michigan State University

Additional Authors: Sohyeon Bae, Michigan State University; Vicki L. Baker, Albion College; Nestor Espinoza, Michigan State University; Adam Grimm, Michigan State University; Austin Hieb, Rollins College; Matt Ring, Michigan State University; Levi Shanks, Michigan State Univ

Strands: Facilitating Change; Improving the Quality of Education; Partnerships Beyond the University

Abstract: Organizational Change Networks (OCNs) connect organizations or institutional leaders advancing change, specifically through focused work with organizational units such as programs or departments. OCNs are powerful levers for accelerating and scaling evidence-based practices in postsecondary STEM education. Our comparative analysis of six OCNs with lifespans ranging from a quarter century to several years is providing insight into key challenges and solutions to critical tasks each OCN faces, including purpose, theory of change, leadership, governance, membership, scalability, funding, and sustainability. OCNs are distinct from networks of individuals, are change-oriented and dynamic, build on collaborative work, and both respond and contribute to the broader higher education environment. Our session will focus on lessons learned that can inform multi-institutional collaborative endeavors.

Poster Abstracts

Formative Peer Observation for Instructional Change

Session: Poster

Authors: Heather Dillon; Stephanie Salomone; Carolyn James; Valerie Peterson; Tara Prestholdt; Eric Ancil, University of Portland

Strands: Facilitating Change; Research; Engaging Faculty

Abstract:At the University of Portland we have developed a formative peer observation protocol and leveraged it to create instructional and cultural change. Individual faculty members participating in peer observation have reported improvements in reflective teaching practices. Specific protocols have been developed to target cultural and instructional shifts needed on campus, including student-centered practices, equity, and creativity. We are looking for collaboration partners at other campuses to help us explore how the protocol might be used for cultural change in other communities.

National Collaborative for Research on Food, Energy, and Water Education (NC-FEW)

Session: Poster

Authors: Cory T Forbes, University of Nebraska-Lincoln; Hannah H Scherer, Virginia Tech; Hui-Hui Wang, Purdue University; Nicole Sintov, The Ohio State University

Strands: ; Retention and Success; Broadening participation/Inclusive Education; Improving the Quality of Education; Assessment; Research; Partnerships Beyond the University; Engaging Faculty

Abstract:Worldwide, there has been growing interest in research, education, and discourse around the FEW-Nexus, which serves as a framework to describe and aid in addressing complex coupled human-natural systems and the most significant global challenges of today and tomorrow. Institutions of higher education must take a leading role in preparing all future citizens for the most pressing global challenges of today and tomorrow. In this poster, we present the National Collaborative for Research on Food, Energy, and Water Education (NC-FEW; <http://ncfew.org>), a new transdisciplinary community of postsecondary educators and education researchers engaged in FEW-Nexus-focused educational programming and research/evaluation. Over the next 5 years, this Research Coordination Network (RCN; ECR-EHR Core Research #1856040) will engage individuals from a diverse array of postsecondary faculty by affording a novel and innovative space for discourse, networking, and collaboration-building around FEW-Nexus-focused education and education research/evaluation.

Using a Multi-level Network Model to Inform Center Management

Session: Poster

Authors: Tracie Reding, University of Nebraska Omaha; Elliott Ostler, University of Nebraska Omaha; Christine Cutucache, University of Nebraska Omaha; Chris Moore, University of Nebraska Omaha

Strands: Facilitating Change; Engaging Faculty; Managing a Center

Abstract: The call for interdisciplinary collaborations within Higher Education Institutions to address the STEM workforce shortage has been highlighted by national agendas and guidelines. This presentation introduces a model that combines multi-level network analysis with more traditional methods to help manage an interdisciplinary collaborative STEM Leadership Group within the context of the STEM TRAIL Center at the University of Nebraska at Omaha. The presentation will introduce the model currently in use by the Leadership team to help inform collaboration management practices, with a particular focus on identifying key players that can facilitate change.

Rethinking the Effort to Implement Creative Strategies for Driving Student Engagement and Success in STEM

Session: Poster

Authors: Charles H. Roberts, Mercer University; Zipangani Vokhiwa, Mercer University

Strands: ; Retention and Success; Broadening participation/Inclusive Education; Improving the Quality of Education; Engaging Faculty

Abstract: In order to prepare substantially more students to become prepared to succeed in their study within STEM disciplines, and establish a foundation for expanding the pool of students who proceed to higher levels of study in those disciplines, it is imperative that the particulars of students' "STEM Learning" deficiencies are aggressively addressed. Consequently, in the process of teaching STEM courses, a keen knowledge of them is crucial. During this presentation, the presenters will highlight the many assorted ways in which students' capacity for "STEM Learning" is thwarted. A lack of base knowledge of certain content that is normally expected, as well as misunderstandings that could seriously retard their development in gaining a proper understanding of the material, are targeted for inspection and exploration. More importantly, presenters will demonstrate strategic instructional responses designed to meet the challenge of facilitating high-quality transitional growth among students toward becoming well positioned "STEM Learners."

Using Professional Development to Support Equitable Learning Opportunities in STEM Lab Settings

Session: Poster

Authors: Ruthmae Sears, University of South Florida; Robert Potter, University of South Florida; Gerry Meisels, University of South Florida; Kelley Schuler, University of South Florida

Strands: Facilitating Change; Retention and Success; Broadening participation/Inclusive Education

Abstract: We will describe how we used a multi-semester professional development, for graduate teaching assistants, to support equitable learning opportunities within STEM Lab settings. Particularly,

we will describe the nature of the professional development that considered modes of instruction and assessment that draws on different funds of knowledge, and the implication of an instructors' beliefs on their instructional practice. We will also share the teaching assistants' feedback on how the professional development influenced their perspectives relative to attending to equity in STEM settings.

Comprehensive broader impacts via the UNO STEM TRAIL Center: Spotlight on NE STEM 4U

Session: Poster

Authors: Nikolaus Stevenson, University of Nebraska at Omaha; Amanda Shultz, University of Nebraska at Omaha; Maggie Kehler, University of Nebraska at Omaha; Caelyn Armshaw, University of Nebraska at Omaha; Katie Slobodnik, University of Nebraska at Omaha; William Tappich, University of Nebraska at Omaha; Neal Grandgenett, University of Nebraska at Omaha; Christine Cutucache, University of Nebraska at Omaha

Strands: Broadening Participation; Beyond Partnerships

Abstract: The STEM Teaching, Research, and Inquiry-Based Learning (TRAIL) Center at the University of Nebraska at Omaha, is now one year old, and after a fast start, is continuing to focus on providing support as a Broader Impacts shop for teachers and researchers alike to facilitate genuine partnerships and to integrate best practices. One such modality is deployment of the out-of-school time, outreach program called NE STEM 4U. The NE STEM 4U program boasts a unique ability in dually serving the out-of-school time needs for K-8 youth by providing STEM enrichment as facilitated by undergraduates. Similarly, these participating undergraduates at the university benefit from extensive professional development via the program (to include leadership skills, pedagogical training, research experiences, and mentorship). Finally, faculty and staff interested in demonstrable broader impacts for their program can tap into an existing infrastructure that has established partnerships, and formative and summative assessment. To date, the NE STEM 4U program, itself six years old, has expanded access and interest in STEM fields, while simultaneously fostering broader participation through the Center. The success of the program in the community is due to the established partnerships outside of the university, to include key public schools' systems (rural and urban), state-wide entities, and afterschool program organizations such as *Collective for Youth*. We highlight the role that these partnerships play in our rapid expansions into broader impacts into the community, as now further expanding through the STEM TRAIL Center infrastructure.

Leadership through STEM Community Engagement

Session: Poster

Authors: David Devraj Kumar, Florida Atlantic University

Strands: Facilitating Change; Research; Beyond Partnerships

Abstract: Leadership development through community engagement in STEM will be presented. Volunteering undergraduate students engaged in community outreach in STEM by integrating their academic preparation in science education at a university and the real-world contexts of STEM exhibits at a local museum developed engaging lessons and present them to the museum visitors. Data from self-reflections of student volunteers showed the emergence of leadership themes especially in self-confidence development and depth of understanding of STEM, followed by a sense of self responsibility and audience STEM learning. In addition to developing leadership skills, student volunteers received Academic Service Learning credits. In the fall of 2019, as part of a funded the Going the Extra Mile Project student volunteers extended their outreach to local K-12 classrooms in high need areas. Curriculum, teacher leadership, STEM literacy and policy implications will be discussed.

Gateways-ND: 5 Years of Creating Pathways to Institutional Change with STEM Faculty Development

Session: Poster

Authors: Jill Motschenbacher, North Dakota State University; James Nyachwaya, North Dakota State University; Lisa Montplaisir, North Dakota State University; Jared Ladbury, Minnesota State University; and Emily Berg, North Dakota State University

Strands: Facilitating Change; Broadening Participation; Engaging Faculty

Abstract: Gateways-ND is a six-year (2015-2021) National Science Foundation (NSF)-funded instructional faculty and staff development program that is designed to offer relevant, collaborative, and sustained support to science, technology, engineering, and math (STEM) postsecondary educators North Dakota State University. The instruction of the program is based on current evidence-based pedagogy and course design to help faculty and staff learn to create and/or reinvent STEM courses to be learner-focused and engaging. Since the program began in 2015, Gateways-ND has made substantial changes in teaching and learning practices, and beliefs, among NDSU faculty, staff, and administration. To date, over 170 faculty and instructional staff have been a part of five cohorts and multiple changes have emerged in STEM instruction at the University. The transition of these changes has highlighted effective pathways that institutions can follow to support STEM instructional change.

Molding great teachers out of STEM-focused graduate students through mentored practice

Session: Poster

Authors: Benjamin L. Wiggins, University of Washington in Seattle; Richard G. Gardner, University of Washington in Seattle; Rebecca M. Price, University of Washington Bothell; Elaine R. Klein, University of Washington in Seattle; Shelley Stromhold, University of Washington in Seattle

Abstract: Graduate students in STEM are a few years from being classroom leaders for a diverse population of talented students worldwide. Compared to their STEM research, these future instructors have fewer options to find high-level training and practice to hone their teaching identities. The Science Teaching Experience Program for Upcoming PhDs (STEP-UP) is for graduate students and provides

rigorous, multi-disciplinary practice in pedagogies for higher education. STEP-UP trains new instructors on a toolkit of equitable teaching strategies for use in classes with diverse populations of students. Participants practice and get feedback on the micro-skills needed for effective active teaching as well as interpersonal methods for supporting and including students from a wide range of backgrounds/ outlooks. We will share early findings from the research team and overviews of the program itself. We also hope there is interest in the methods used for equitable teaching by other teacher-educators in our community.

Using Flipped Learning with Peer Assessment to Improve Student Microscopy Skills in Gateway Biology Courses

Session: Poster

Authors: Adijat Adebola, Bronx Community College, CUNY, Raffaella Diotti, Bronx Community College, CUNY; Goldie Sherr, Bronx Community College, CUNY

Abstract: Students enrolled in gateway biology courses at Bronx Community College generally express interest in pursuing careers in STEM or the health sciences. Both fields of study require students to be proficient in basic laboratory skills. One such skill is the ability to properly use a compound light microscope. While students are introduced to microscopy in gateway courses, many often complete these courses without developing proficiency or comfort in using microscopes. This poses a problem as this skill is required for upper level biology and health science courses. To address this problem, a combination of instructor-designed screencast videos illustrating microscope parts and their functions, YouTube videos depicting proper use of compound light microscope, and a microscope techniques peer-assessment activity were used in two biology courses to improve student microscopy skills. The presenters will share their experience using a flipped classroom approach coupled with an interactive peer-assessment activity for microscopy instruction.

Positive Effects of Active Learning Strategies on Students' Achievements

Session: Poster

Authors: Elizabeth Lugosi, The University of Arizona; Guillermo Uribe, Data Analyst, The University of Arizona

Abstract: Six active learning (AL) strategies used in college algebra and business calculus courses will be introduced showing specific examples. These AL strategies are, interactive presentation style, group-work with discussion and feedback, volunteer presentations of solutions by groups, raise students' learning interest towards specific topics, involve students in mathematical explorations, experiments, and projects, and last but not least, continuous motivation and engagement of students.

The research study approved by the Institutional Review Board of the Human Subjects Protection Program will be summarized. In the study, the achievement of students under the various level of AL use

was analyzed using statistical methods. The results of the study demonstrate that the application of AL strategies has a positive effect on the average results of the sections and the passing rates of the students.